Before the
Federal Communications Commission
Washington DC 20554

In the Matter of	)	
	)	ET Docket 01-278
Review of Part 15 and Other Parts	)	RM-9375
of the Commission's Rules	)	RM-10051

REPLY COMMENTS OF INTERSIL CORPORATION

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REPLY COMMENTS OF INTERSIL CORPORATION

Pursuant to Section 1.415 of the Commission's Rules, Intersil Corporation submits these Reply Comments in the above-captioned rulemaking.[1]

Intersil replies to comments filed on February 12, 2002, by Sirius Satellite Radio Inc. and XM Radio Inc. (collectively, DARS providers), specifically with regard to the DARS providers' requests concerning Part 15 products that operate in the 2400-2483.5 MHz band.

About Intersil. Intersil is a global leader in designing innovative wireless networking and high performance analog solutions that enable wireless access to video, data, and voice. Our product portfolio includes complete chipset solutions for wireless LAN (WLAN) applications in the 2.4 GHz band. End products employing 2.4 GHz WLAN technology are currently in broad use in businesses, homes, and classrooms.

A. Summary

To avoid interference to DARS systems, providers Sirius and XM Radio say the Commission must reduce Part 15 out-of-band limits into their band by 35 dB, from the present 500 μV/m at 3 meters (measured over 1 MHz) to an aggregate limit of 8.6 μV/m.

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[1] *Review of Part 15 and other Part of the Commission's Rules*, ET Docket 01-278, Notice of Proposed Rulemaking and Order, FCC 01-290 (released Oct. 15, 2001) (Notice).

But Part 15 is not the source of problems in the DARS systems, which provide only 6.7 dB link margin for fading and attenuation. That is inadequate for reliable operation in other than a line-of-sight application. Evidence is the DARS providers' need to supplement the satellites with a network of 1500 terrestrial repeaters at up to 40 kW. Ironically, the repeaters are likely to resolve any Part 15 interference issues, because they will be deployed in urban areas, where most Part 15 devices are used.

The requested Part 15 limits are below the thermal noise floor, and are based on a succession of very pessimistic assumptions. Even if adopted, however, they would not materially improve system reliability. Moreover, an aggregate limit can be neither implemented nor enforced, as Part 15 manufacturers have no control over where their products will be used. And the DARS providers' demand for service availability in excess of 99 percent may seek more interference protection that the Commission's "harmful interference" rules provide.

Finally, the Administrative Procedure Act bars the Commission from granting the requested relief without a Further Notice of Proposed Rulemaking.

B. Positions of Sirius and XM Radio

The Commission's Rules prohibit intentional emissions from Part 15 devices in the 2320-2345 MHz DARS band, and limit out-of-band emissions from these devices to 500 μV/m at 3 meters.

Sirius and XM Radio ask the Commission to reduce the Part 15 out-of-band limit by 35 dB, to 8.6 μV/m at 3 meters.[2] Otherwise, they say, the cumulative interference from proliferating Part 15 devices will interfere with DARS receivers.[3]

As precedent, XM Radio alleges the proposed limit is less stringent than the out-of-band emissions limit imposed on Miscellaneous Wireless Communications Service in the DARS band.[4]

Sirius cites pleadings in the recent ultra-wideband proceeding, ET Docket No. 98-153, for the proposition that signals from multiple Part 15 devices aggregate to produce cumulative effects,[5] and asks the Commission to impose its requested limit on the cumulative emissions from Part 15 devices.[6]

C. Procedural Bar

As a preliminary matter, the Commission is barred by statute from granting the requested relief at this stage of the proceeding.

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[2] Sirius Comments at 2; XM Radio at 19. These values assume a 1 MHz measurement bandwidth. *See* 47 C.F.R. Sec. 15.35(b). XM Radio would separately limit vehicle-mounted devices to 18 μV/m at 3 meters measured across 2 MHz. XM Radio at 19.

[3] Petition for Rulemaking of Sirius Satellite Radio Inc., *passim* (filed Jan. 23, 2002) (filed as an attachment to Comments of Sirius Satellite Radio Inc. in this proceeding) (Sirius Petition); XM Radio at 18-20.

[4] XM Radio at 20-21 & n.38.

[5] Sirius Petition at 13.

[6] Sirius Comments at 2.

The Administrative Procedure Act requires a published notice of proposed rule making, and consideration of public comment, prior to the adoption of rules.[7]

The issues raised by Sirius and XM Radio do not appear in the present Notice, and so cannot be addressed without a Further Notice of Proposed Rulemaking. For the reasons set out below, we doubt that additional proceedings would be justified. But if the Commission nonetheless chooses to pursue these issues, it should do so by placing the Sirius Petition on public notice and requesting comment. We think the resulting record will lay the matter to rest. But if the Commission wishes to proceed beyond that point, then it must issue an appropriate Further Notice in accordance with the APA.

D. DARS Providers' Requests are Unjustified.

Intersil opposes more restrictive limits on out-of-band emissions for Part 15 devices. The DARS providers currently have adequate protection under Sections 15.205 and 15.209 of the Commission's Rules. Reduction in Part 15 limits will seriously jeopardize the commercial viability of unlicensed devices operating in the 2.4 GHz ISM band. More importantly, however, as we show below, the DARS providers simply fail to justify their requests.

The DARS providers object that the number of unlicensed devices operating in the 2.4 GHz band has dramatically increased over the past several years, and will increase

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[7] "General notice of proposed rule making shall be published in the Federal Register, unless persons subject thereto are named and either personally served or otherwise have actual notice thereof in accordance with law. The notice shall include . . . (3) either the terms or substance of the proposed rule or a description of the subjects and issues involved." 5 U.S.C. Sec. 553.

further in the future.[8] This merely reflects the commercial success of these devices. Manufacturers have provided U.S. consumers with an unprecedented array of products now deployed in businesses, homes, and classrooms. The Part 15 Rules are among the Commission's most successful examples of sound spectrum management. Further development of unlicensed spectrum should be encouraged, rather than unnecessarily restricted.

If DARS providers have trouble serving their customers, Part 15 is not to blame. Rather, it appears the DARS providers built a fragile system, and now turn to the Commission for relief from the shortcomings of their own engineering. In the absence of a repeater network (discussed below), the unreliability inherent in DARS system in urban areas poses a much greater threat to service than any interference from Part 15 devices.

Predictability of Part 15 devices. The existence of Part 15 devices should have been no surprise to DARS designers. Sirius claims that when it and XM Radio designed their systems in 1997, the widespread use of mobile Part 15 devices did not exist.[9] In fact, by that time the market for mobile spread spectrum wireless LAN devices was well established, and greatly increased use of unlicensed mobile wireless technologies was widely foreseen. Although the Commission's Rules give a licensed service such as DARS precedence over Part 15,[10] a prudent engineer will nonetheless design for the environment in which the system will operate, rather than construct an inadequate system

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[8] Sirius Comments at 8-10; XM Radio at 16.

[9] Sirius Petition at 21.

[10] 47 C.F.R. Sec. 15.5.

and then go to the Commission for relief. Part of the DARS environment is Part 15 devices, whose proliferation over the past five years has not surprised anyone who reads the trade press.

Ironically, a week *after* the DARS auction in April 1997,[11] the Commission *significantly reduced* the potential emissions from spread spectrum devices into the DARS band.[12] Thus, at the time they placed their bids, the DARS providers knowingly faced a much worse interference threat. The tightening of spread spectrum out-of-band emissions shortly afterward was a windfall, which should have made possible provide improved service at the same spectrum cost. But the DARS providers now request additional relief despite the stringent rules in effect today.

Unwarranted request for protection. XM Radio states that its system requires a service availability of over 99 percent, claiming subscribers will not tolerate intermittent outages or bursts of noise.[13] Part 15 is required to protect a licensed service such as DARS only against *harmful* interference, defined as interference that "seriously degrades,

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[11] *See* American Mobile Radio Corp., 13 FCC Rcd 8829 (Int'l Bur. 1997); Satellite DC Radio, 13 FCC Rcd 7971 (Int'l Bur. 1997).

[12] Prior to 1997, the spread spectrum rules required spurious out-of-band emissions produced by the modulation products of the spreading sequence, the information sequence, and the carrier to be attenuated by only 20 dB, while all other out-of-band emissions were subject to the much tighter general limits in Section 15.209. *Spread Spectrum Transmitters,* 12 FCC Rcd 7488 at para. 46 (1997). In that year the Commission simplified the rules to the present form. Out-of-band emissions into the Section 15.205 restricted bands, including the DARS band, are now subject to the limits in Section 15.209 regardless of source. *Id*. at paras. 46-47; 47 C.F.R. Sec. 15.247(c). The 1997 decision thus significantly reduced possible emissions into the DARS band.

[13] XM Radio at 3-4, 18.

obstructs, or repeatedly interrupts a radiocommunication service."[14] Brief, intermittent interference may not qualify as "harmful interference" under this standard. Intersil does not dispute that DARS may need more interference protection than the Commission's Rules provide. But in that event the DARS providers should have designed a system capable of delivering the required reliability, in accordance with the rules.

Implications of terrestrial repeaters. Sirius describes a link with a system margin for fading and attenuation of only 6.7 dB.[15] This is insufficient for reliable commercial operation in other than a line-of-sight application. Evidence of inadequate design is buttressed by the DARS providers' need to supplement their satellites with a network of 1500 terrestrial repeaters at up to 40 kW.

Along with patching up an unsuccessful design, the repeater network also eliminates most Part 15 interference concerns. Repeaters are being deployed in urban areas, to place signals into urban canyons that are blocked from view of the satellite.[16] But these are the same areas that see the greatest use of Part 15 devices. The DARS providers do not seriously attempt to argue that repeater transmissions will suffer interference from Part 15,[17] so the urban areas with the highest Part 15 densities should also be those with the least interference into DARS, thanks to the repeaters. On the open

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[14] 47 C.F.R. Sec. 2.1. The standard is stricter for interference into a radionavigation service or other safety service. *Id*.

[15] Sirius Petition at Attachment 1.

[16] *See Rules and Policies for the Digital Audio Radio Satellite Service in the 310-2360 MHz Frequency Band,* 12 FCC Rcd 5754 at para. 138 (1997). *See also* XM Radio at 4.

[17] *But cf*. XM Radio at 4.

highway and in rural areas, where repeaters are unnecessary, Part 15 deployment is very sparse, so again no interference should result.

Unrealistic numerical limits. Sirius states that the maximum tolerable interference level for its receivers is –152.6 dBW/MHz.[18] This level is actually about 8 dB below the thermal noise floor. Even if accepted at face value, this value is based on some very pessimistic assumptions. Note that this receiver input level is at the edge of coverage.[19] Sirius also chooses to neglect the effects of directional discrimination in the DARS receiver antenna. The DARS signal is transmitted from satellites in either geostationary or elliptical orbits. Thus, the Angle-of-Arrival (AOA) is always well above the horizon. However, any potential interference from Part 15 devices will nearly always come from an AOA near the horizon -- *i.e.*, from a terrestrial source. A well designed DARS antenna should not only have directional gain oriented toward zenith, but should also have a null near the horizontal.

Sirius also indicates that the combined effects of multipath, foliage attenuation, and external interference must not exceed 6.7 dB. In fact, the cumulative effect of these impairments will routinely exceed 6.7 dB. The inescapable conclusion is that Sirius has designed a system having inadequate link margin in a non-line-of-sight application.

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[18] Sirius Petition at 22.

[19] Sirius Petition at Attachment 1.

Sirius proposes a maximum aggregate interference level from Part 15 and Part 18 devices of 8.6 μV/m at 3 meters.[20] This is fully 35 dB below the present limits.[21] To put this into perspective, the requested limit is actually is below the thermal noise floor, and is immeasurably low, given the Commission's currently accepted methods.

Considering that Sirius failed to provide an adequate design margin, its present request is not justified, and ultimately will not result in a material improvement to system reliability. The fact that a nationwide network of high power repeaters was required to ensure reliable DARS operation in urban areas provides ample evidence of the system's inherent shortcomings. Sirius fails even to mention the presence of this network of high power repeaters in estimating the impact of interference from Part 15 and Part 18 devices.

Request for aggregate limits. The request is unreasonable in another respect as well. The demand for an aggregate limit is not only unprecedented in Commission regulation (see below), but seeks a rule that can be neither implemented nor enforced. Manufacturers of a Part 15 device have no control over where it will be used, and have no way to control the aggregation of deices or their emissions.

E. There is No Precedent for the DARS Requests.

The DARS providers claim two precedents for the relief they seek against Part 15. Both are mistaken.

Emission limit. XM Radio claims its proposed limit is less stringent than the out-of-band emissions limit imposed on Miscellaneous Wireless Communications Service

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[20] *Id*.

[21] *See* 47 C.F.R. Secs. 15.205, 15.209.

(MWCS) in the DARS band.[22] Specifically, XM Radio calculates that its proposed standard of 8.6 μV/m at 3 meters is equivalent to –79.4 dBm,[23] while the MWCS limit is –80 dBm.[24] To claim that –79.4 dBm is "less stringent" than –80 dBm is technically correct, but certainly misleading, inasmuch as the number are very close.

More important, citing the MWCS limits as precedent overlooks the critical location of the MWCS bands: immediately adjacent to the DARS band, enclosing it on both sides. The MWCS Report and Order that imposed these limits repeatedly emphasized that stringent out-of-band limits were needed to protect *adjacent* DARS operations.[25] The same reasoning would not apply to non-adjacent frequencies, such as Part 15 operations 55 MHz away in the 2.4 GHz ISM band. Indeed, at that time no service other than the adjacent MWCS was subjected to special out-of-band limits for DARS.

Aggregate emissions. The Commission has never regulated aggregate emissions from Part 15 devices. Sirius nonetheless tries to wring a precedent from the recent ultra-wideband (UWB) proceeding by citing pleadings that purport to show aggregate effects of UWB devices. Sirius recites that a party is studying cumulative effect of UWB emissions

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[22] XM Radio at 20-21 & n.38.

[23] *Id*.

[24] XM Radio at 20-21 & n.38.

[25] *E.g*., Wireless *Communications Service*, 12 FCC Rcd 10785 at paras. 136, 138 (1997).

on PCS phones,[26] quotes NTIA as stating that UWB signals sum,[27] and declares (with no other support) that cumulative effect of UWB devices on GPS receivers is "well established."[28]

Reasoning from the UWB proceeding has three serious defects. First, other parties to the UWB proceeding presented technical analyses showing that UWB signals do *not* aggregate to harmful levels.[29] Second, although at this writing the Commission has not yet released the Report and Order in the UWB proceeding, neither the news release announcing adoption of the item, nor remarks at the open meeting by Commissioners and staff, suggest the Commission has attempted to limit aggregate UWB emissions.[30] And, third, both of the commissioners that issued separate statements in the proceeding focused on the ultra-conservative nature of the limits, with Commissioner Copps going so far as to emphasize that the decision "*should not be taken as precedent* for any other interference dispute -- *involving other Part 15 devices*, government bands,

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[26] Sirius Petition at 12.

[27] *Id*. at 13.

[28] *Id*. at 13.

[29] *See, e.g.*, Letter from Mitchell Lazarus, Counsel for XtremeSpectrum,. Inc., to Ms. Magalie Salas, Secretary, FCC at 7-9 (filed in ET Docket No. 98-153, Jan. 3, 2002).

[30] *See New Public Safety Applications and Broadband Internet Access among Uses Envisioned By FCC Authorization of Ultra-Wideband Technology* (released Feb. 14, 2002).

or other new technologies."[31] The Commission has marked the UWB proceeding as one of a kind. It is not a sound basis for decision making in other contexts.

In short, both the DARS providers' proposed Part 15 emissions limits, and their proposal to regulate aggregate emissions from Part 15 devices, are without precedent in the Commission's Rules.

CONCLUSION

The DARS providers ask for unjustified numerical limits, unwarranted protection against non-harmful interference, and unprecedented protection against interference from aggregate emissions.

Intersil is confident that any risk to DARS stems not from Part 15 devices, but from shortcomings inherent in the DARS system. Fortunately, the network of terrestrial stations needed to correct for those shortcomings also protects against Part 15 interference.

In weighing the actual risk of harmful interference to DARS from Part 15 devices, the Commission must eventually take into account the public benefit realized by U.S. consumers from the successful and responsible commercial development of Part 15

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[31] *Id*., Separate Statement of Commissioner Kevin J. Martin (released Feb. 14, 2002); *id*., Separate Statement of Commissioner Michael J. Copps (released Feb. 14, 2002) (emphasis added).

equipment operating in the 2.4 GHz ISM band. But the Commission cannot lawfully consider the requested relief without a Further Notice of Proposed Rulemaking.

Respectfully submitted,

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SERVICE LIST

I certify that I have caused copies of the foregoing "Reply Comments of Intersil Corporation" to be transmitted by email and by hand delivery to the following persons:

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